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Pharyngodon oceanicus sp. n. (Nematoda: Pharyngodonidae) from the Oceanic Gecko, *Gehyra oceanica* (Sauria: Gekkonidae) of the Pacific Islands

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ABSTRACT: One hundred twenty-six *Pharyngodon oceanicus* sp. n. were found in the large intestines of 14 of 37 adult *Gehyra oceanica* collected from the Cook and Society islands. *Pharyngodon oceanicus* sp. n. represents the thirty-first species of the genus and the second species to be described from islands of the Pacific Ocean. It can be distinguished from all other species of *Pharyngodon* by the shape of the egg and by the presence of a cluster of spines at the base of the tail of the female.

KEY WORDS: *Pharyngodon oceanicus* sp. n., Pharyngodonidae, *Gehyra oceanica*, Gekkonidae, Pacific Islands.

The oceanic gecko *Gehyra oceanica* (Lesson, 1830) was originally described from Tahiti but occurs in Australia, New Zealand, Indonesia, and throughout Oceania (Welch et al., 1990). It is a common arboreal species that frequents human habitations (McCoy, 1980). In a recent helminthological survey, 5 of 7 *G. oceanica* collected from the Cook Islands were found to harbor 23 male and 33 female nematodes of a previously undescribed species of *Pharyngodon* Diesing, 1861. Subsequently, 7 of 30 *G. oceanica* from the Society Islands were found to be infected with 20 males and 50 females of the same unidentified species of *Pharyngodon*.

The genus *Pharyngodon* was established by Diesing (1861) with *P. spinicauda* (Dujardin, 1845) from a lizard, *Lacerta muralis*, collected at St. Malo, France, as the type species. Skrjabin et al. (1960) revised the genus to retain only those species in which males have well-developed caudal alae forming a genital bursa enveloping the 3 pairs of caudal pedunculate papillae and females have the vulva in the anterior half of the body. There are currently 30 species (an additional 4 species, *P. boulengerula* Ubelaker, 1965, *P. elongata* Markov and Bogdanov, 1961, *P. sphaerodactyli* Barus and Coy Otero, 1974, and *P. polypedatis* Yamaguti, 1941, are known only from female specimens and are designated as *species inquirendae*). Species of *Pharyngodon* occur primarily in lizards of the families Gekkonidae, Phrynosomatidae, Scincidae, and Teiidae; however, 2 species, *Pharyngodon bursatus* Rao, 1980, in *Euphlyctis cyanophlyctis* (=*Rana cyanophlyctis*), and *P. schistopapillatus* Rao, 1980, from *Bufo viridis*, are known from amphibians. Of the species infecting lizards, 9 are found in the Palaearctic Zoogeographical Realm, 5 each in the Nearctic and Australian realms, 4 in the Neotropical Realm, 3 in the Oriental Realm, 1 in the Ethiopian Realm, and 1 in Oceania.

Materials and Methods

Of the 37 *G. oceanica* examined in this study, 7 were collected on Rarotonga, Cook Islands (21°30′S, 160°00′W) in 1991; 10 on Tahiti, Society Islands, French Polynesia (17°42′S, 149°30′W) in 1991; and 20 on Moorea, Society Islands (17°28′S, 149°50′W) in 1992. All were captured by hand and fixed in neutral buffered 10% formalin, then preserved in 70% alcohol. Specimens from Moorea were deposited in the herpetology collection of the Natural History Museum of Los Angeles County as LACM No. 141009–141028. The body cavity was opened by a longitudinal incision from vent to throat, and the gastrointestinal tract was removed and opened longitudinally. Nematodes were placed in undiluted glycerol, allowed to clear, and examined under a light microscope. Measurements are in micrometers unless indicated otherwise.

Results

Five of the 7 (71%) *G. oceanica* collected from Rarotonga, 4 of 10 (40%) from Tahiti, and 3 of 20 (15%) from Moorea were infected. A description of the new species follows.

Pharyngodon oceanicus sp. n. (Figs. 1–8)

Description

Males with caudal alae that envelop posterior postcloacal pair of pedunculate papillae; females

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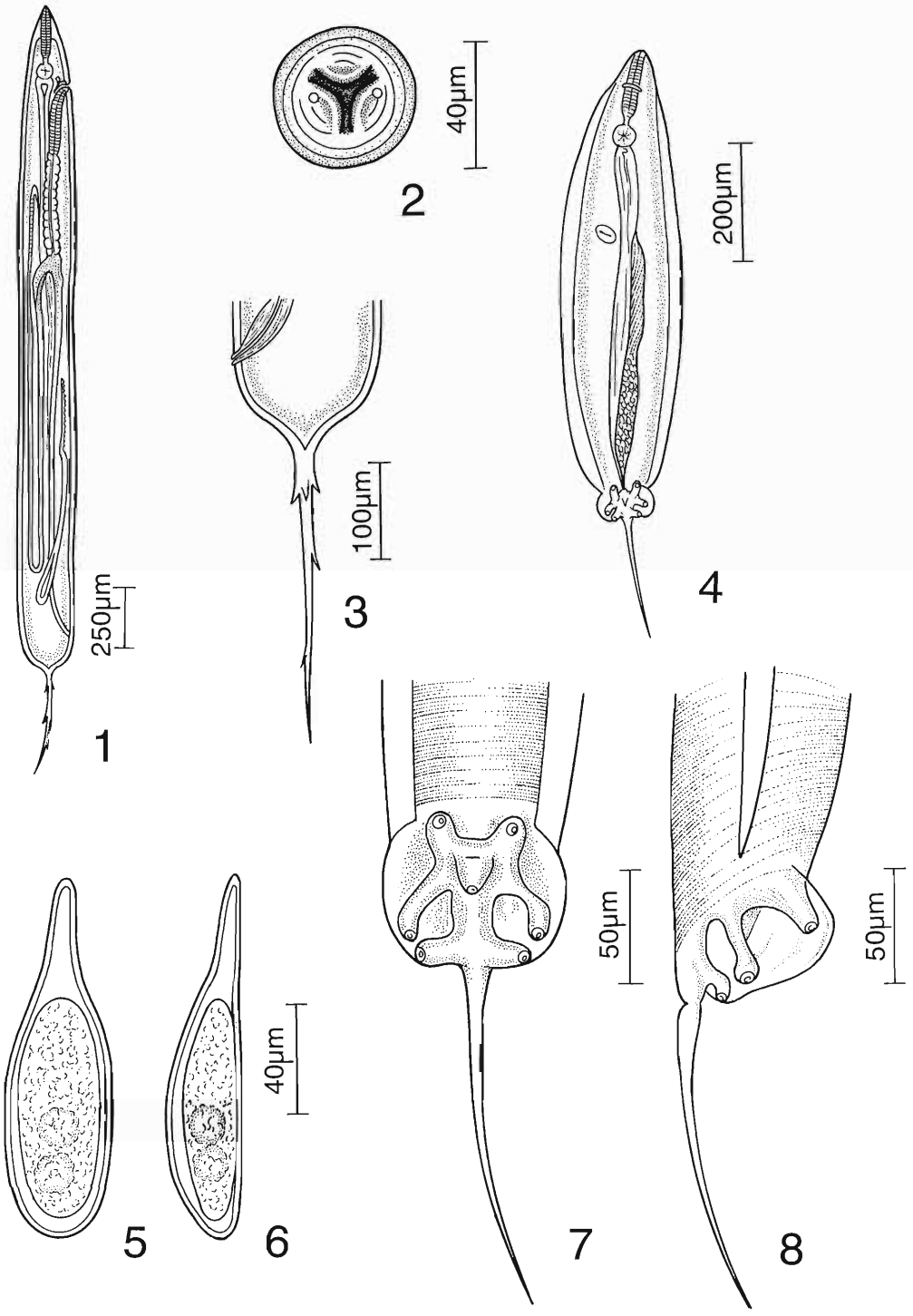

Figures 1–8. ***Pharyngodon oceanicus*** **sp. n. 1. Female, entire, lateral view. 2. Female, *en face* view. 3. Posterior end of female, lateral view. 4. Male, entire. 5. Egg, dorsal view. 6. Egg, lateral view. 7. Posterior end of male, ventral view. 8. Posterior end of male, lateral view. Scale bar values are given in micrometers.**

with vulva in anterior half of body. Nematodes of small size with cylindrical body tapering anteriorly and posteriorly. Cuticle with distinct transverse striations extending from behind lips to level of anus. Lateral alae present in males only. Mouth bounded by 3 lips. Esophagus ending in valvulate, spherical bulb separated from esophageal body by small constriction. Filamentous tail in both sexes.

MALE (based upon 10 specimens; mean measurement and range in micrometers): Small, white, fusiform nematodes tapering both anteriorly and posteriorly; length 1,413 (1,111–1,820); width at level of excretory pore 152 (100–190). Lateral alae 12 (10–13) wide, extending from level of nerve ring to middle of genital bursa. Cuticle with fine cross-striations at 1-μm intervals, extending entire length of body. Mouth opening surrounded by 3 lips, V-shaped notch between each. One small, pedunculate amphid on each ventrolateral lip. Esophagus (excluding bulb) 134 (97–160); bulb length 50 (46–54), bulb width 48 (46–54). Nerve ring 111 (103–120), excretory pore 497 (360–590) from anterior end, respectively. Well-developed caudal alae present. Three pairs of caudal papillae; precloacal pair situated on slightly inflated anterior portion of caudal end, adcloacal pair posteriolaterally directed, and postcloacal pair enclosed by caudal alae, behind adcloacal pair. Filiform tail extending 152 (137–177) beyond postcloacal papillae. Spicule absent; prominent genital cone with the posterior lip supported by sclerotized V-shaped structure. Single vas deferens and testis terminating at level of excretory pore.

FEMALE (based on 10 gravid specimens): Slender, white, cylindrical nematodes tapering anteriorly and posteriorly; posterior supporting filamentous tail. Length 6,150 (4,500–7,500); maximum width 276 (228–325). Lateral alae absent. Cuticle with fine cross-striations at 3–4-μm intervals. Esophagus (excluding bulb) 223 (204–242), bulb length 84 (77–91), bulb width 80 (68–88). Nerve ring 107 (91–125); excretory pore 353 (255–434), vulva 409 (293–510) from anterior end, respectively. Vagina directed posteriorly, thick, muscular anterior portion 430 (322–510) and glandular posterior portion 647 (536–765). Ovaries with flattened oocytes arranged in single file. Anterior fifth of body usually devoid of ovarian and uterine coils. Filamentous portion of tail 415 (357–484) with cluster of 2–3 heavy spines 45 (34–57) from junction with body, 3–4 small spines along remaining length. Thick-shelled nonoperculated eggs 137 (131–143) by 34 (31–37) flattened on one side, one end drawn out, poles unadorned. Pronucleus stage of development at deposition.

TYPE SPECIMENS: Holotype male, U.S. National Parasite Collection, Beltsville, Maryland USNPC No. 87745. Allotype female, USNPC No. 87746. Paratypes, USNPC No. 87747.

TYPE HOST: *Gehyra oceanica.*

TYPE LOCALITY: Rarotonga, Cook Islands.

OTHER LOCALITIES: Moorea, Tahiti, Society Islands.

ETYMOLOGY: The specific epithet is derived from the general name of the nematode's geographic location.

Discussion

The general morphology of *P. oceanicus* sp. n. allows its assignment to the Oxyuroidea Railliet, 1916, Pharyngodonidae Travassos, 1919. Within the family, there are 3 genera characteristic of reptiles, which exhibit a vulvar opening in the anterior part of the body just behind the postbulbar excretory pore: *Pharyngodon, Spauligodon* Skrjabin, Schikhobalova, and Lagodovskaja, 1960, and *Skrjabinodon* Inglis, 1969. These genera are distinguished by the relationship of the caudal alae to the genital papillae; males of *Pharyngodon* have well-developed caudal alae that form a genital bursa enveloping all genital papillae; males of *Spauligodon* have the posterior pair of papillae excluded from the genital bursa; and males of *Skrjabinodon* lack caudal alae. Inclusion of the described specimens in the genus *Pharyngodon* is based on the position of the vulva and the configuration of the caudal alae.

Species of *Pharyngodon* are separated on the presence or absence of a spicule, the morphology of the caudal alae, the shape of the egg, the presence or absence of spines on the tail filament of adults, and their distribution (see Table 1 in Bursey and Goldberg [1996]). One other species has been reported from islands of the Pacific Ocean, namely *P. lepidodactylus* from Hawaii. *Pharyngodon oceanicus* is easily distinguished from *P. lepidodactylus* by the tail filament of the female; in *P. lepidodactylus,* a subulate tail filament without spines is in contrast to the filamentous tail filament with cuticular spines of *P.*

oceanicus. Both *P. lepidodactylus* and *P. oceanicus* have "bottle-shaped" eggs, i.e., one end is drawn out into a narrow projection, which contrast with the truncated, fusiform, or oval eggs of the other species. In *P. lepidodactylus,* the eggs have cuticular knobs at the poles; the egg poles of *P. oceanicus* are unadorned.

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Diagnostic Parasitology Course

The "Diagnostic Parasitology Course" is being offered 2–13 August, 1999 at the Uniformed Services University of the Health Sciences, Bethesda, Maryland 20814-4799. This course will consist of a series of lectures and hands-on laboratory sessions covering the diagnosis of parasitic infections of humans. In addition to the examination of specimens, participants will be able to practice various methods used in the diagnosis of intestinal, blood, and tissue parasitic diseases. Parasitic diseases encountered throughout the world will be included. Slide presentations and videotapes will be available for study. The course will be held at the University's campus, utilizing up-to-date lecture rooms and laboratory facilities. Microscopes will be available on a loan basis and laboratory supplies will be provided. Certain reference specimens will also be available for personal use.

The registration fee for the 2-week course is US$1,000.00. U.S. Government employees, including military personnel, may take the course at a reduced rate. Enrollment is limited, so those interested should register as soon as possible. Previous laboratory experience is recommended.

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